CYANAMID

Contains No CBI & Initial

8EHQ-1193-12748

American Cyanamid Company
One Cyanamid Plaza
Wayne, NJ 07470

88940000034

. Michael D. Utidjian, M.D.
orporate Medical Director

November 3, 1993

8EHQ-93-12748
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Document Processing Center (T
ATTN: SECTION 8(E) COORDINATC
U.S. Environmental Protectior
401 M Street, S.W.
Washington, D.C. 20460

Dear Sir/Madam:

The purpose of this letter is to inform you under Section 8(e) of TSCA of the study "Alga, Growth Inhibition Test" on a commercial cationic polymer mixture. The mixture has the following composition:

CAS#	Chemical Name	%
007732-18-5	Water	~50
042751-79-1	Dimethylamine-Epichlorhydrin-Ethylenediamine Polymer	~49

This study reports a 96-Hour Static E_rC_{50} of 0.058 mg/l with a no-effect level at 96 hours of 0.008 mg/l and a 96-Hour Static E_bC_{50} of 0.031 mg/l with a no-effect level at 96 hours of 0.008 mg/l.

EC50 determinations without suspended solids overestimates the true toxicity of cationic polymers. Suspended solids and other dissolved organic materials like humic acid which are present in natural waters reduce the effective concentration of the polymer and thereby its toxicity.

It is our understanding that the EPA is aware of the "mechanical" nature of the toxicity produced by cationic polymers and therefore, this information confirms data already known to the agency.

A final report of this study is enclosed. This document does not contain confidential business information.

Please direct all communications on this subject to Patricia Ann Vernon, Associate Toxicologist at the above address or call her at (201) 357-3375.

RECEIVED 11-2-93

Sincerely,

H. M Utidjian, M.H.

H. Michael D. Utidjian, M.D.
Corporate Medical Director

27 pgs.

EXXON BIOMEDICAL SCIENCES, INC.

PROJECT NUMBER: 144467

ALGA, GROWTH INHIBITION TEST

TEST MATERIAL: MRD-92-444
(CT-519-92O)

PERFORMED AT:

EXXON BIOMEDICAL SCIENCES, INC.
ENVIRONMENTAL TOXICOLOGY LABORATORY
METTLERS RD. CN 2350
EAST MILLSTONE, NEW JERSEY 08875-2350

COMPLETION DATE: OCTOBER 13, 1993

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APPROVAL SIGNATURES

M. E. Targia

13 Oct 93

M. E. Targia, B.A.
Study Director
Environmental Toxicology Laboratory

DATE

D. H. Wasserstrom

8 OCT 1993

D. H. Wasserstrom, M.E.
Director of Environmental Toxicology

DATE

L D Twitty

12 Oct 93

L. D. Twitty, A.S.
Analytical and Fate Chemistry Supervisor

DATE

I hereby declare to the best of my knowledge, this study was conducted in accordance with the OECD Principles of Good Laboratory Practice, set forth in C(81)30 (Final), Annex 2 with the exceptions listed in the Guideline / Regulation Deviations section of this document.

M. E. Targia

13 Oct 93

M. E. Targia, B.A.
Study Director
Environmental Toxicology Laboratory

DATE

PERSONNEL

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Technicians

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J. Yarusinsky

Analytical and Fate Chemistry Supervisor

L. D. Twitty, A.S.

Compound Preparation Supervisor

M. A. Elliott, B.S.

Quality Assurance Supervisor

J. R. Jackson, B.S.

QUALITY ASSURANCE STATEMENT

STUDY NUMBER: 144467

TEST SUBSTANCE/ARTICLE: MRD-92-444

STUDY SPONSOR: Cytec Industries

Listed below are the dates that this study was inspected by the Quality Assurance Unit of Exxon Biomedical Sciences, Inc., and the dates findings were reported to the Study Director and Management.

Date(s) of Inspection	Reported to Study Director	Reported to Management
18-Feb-93	18-Feb-93	23,25-Feb-93
05-08-Mar-93	08-Mar-93	01,06-Jun-93
12-14-Jun-93	14-Jun-93	28-Jul-93 03-Aug-93

Joanne R. Jackson, B.S.
Quality Assurance Supervisor

4 Aug 93
Date

SUMMARY

An alga, *Selenastrum capricornutum* growth inhibition test was performed to evaluate the acute toxicity of the test material MRD-92-444 (CT-519-92O).

Preliminary methods development indicated that mixing the test material in dilution water for 1 hour was most appropriate for this study.

The nominal treatment levels for the test were 5mg/L, 1mg/L, 0.2mg/L, 0.04mg/L, 0.008mg/L and a control of algal nutrient media. A 5mg/L stock solution was prepared by adding the appropriate amount of test material to algal nutrient media. The stock was mixed (<10% vortex) on a magnetic stirplate with a Teflon® coated stirbar for approximately 1 hour. Treatments were prepared by diluting the appropriate amount of stock with algal nutrient media. Samples were removed from each treatment and analyzed for carbon content. The alga were exposed for a 96-hour period under static conditions.

A noticeable reduction in algal cell density was observed in the 5mg/L and 1mg/L treatments within ~ 25 minutes of study initiation. By day 1, cell densities in the 5mg/L, 1mg/L and 0.2mg/L treatments were below detectable limits.

Due to the low percentage of carbon in this material (20.86%) and the variability of the analytical method at the loading levels tested, measured concentrations of the test material could not be determined. As such (and since this material is soluble), nominal concentrations were used for statistical evaluation and reporting.

The calculated 96-hour NOEC (No Observable Effect Concentration) and LOEC (Lowest Observable Effect Concentration) values were 0.008mg/L and 0.04mg/L, respectively, based on nominal concentration for both growth rate and growth (biomass). The EC50 is the calculated concentration of test material which results in a 50% reduction in growth (E_bC50) or growth rate (E_rC50) relative to the control. The calculated 96-hour E_rC50 was 0.058mg/L based on the nominal concentration. The calculated 96-hour E_bC50 was 0.031mg/L based on the nominal concentration.

INTRODUCTION

This study was conducted for Cytec Industries, 5 Garret Mountain Plaza, West Paterson, NJ 07424, to evaluate the acute toxicity of the test material MRD-92-444 (CT-519-92O) to the alga, *Selenastrum capricornutum*.

This test was conducted in general agreement with OECD[1] guidelines, and was performed to comply with OECD GLP regulations[2].

The study was performed by the Environmental Toxicology Laboratory of Exxon Biomedical Sciences, Inc., Mettlers Road, CN 2350, East Millstone, NJ 08875-2350. The Environmental Toxicology Laboratory is certified by the New Jersey Department of Environmental Protection and Energy for Acute Bioassay Testing.

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[1] *Alga, Growth Inhibition Test.* OECD Guidelines for Testing of Chemicals. Section 2: Effects on Biotic Systems. Guideline 201, adopted 7-Jun-84.

[2] *OECD Principles of Good Laboratory Practice,* C(81)30 (Final), Annex 2.

MATERIALS AND METHODS

Study Initiation Date

17-Feb-93

In-life Test Period

8-Mar-93 to 12-Mar-93

Experimental Termination

12-Mar-93

Test Material Identification

MRD-92-444 (CT-519-92O)

Description

Amber liquid

Storage Conditions

Room temperature

Vehicle

None

Justification of Dosing Route

Potential environmental exposure to the test material is in water.

Carrier / Dilution Water

Algal Nutrient Media[3], no chelating agents (Na_2EDTA) included (see Table 3).

[3]Miller, et.al., 1978. The *Selenastrum capricornutum* Printz Algal Assay Bottle Test. EPA-600/9-78-018.

Characterization of Test Material

The identity (including batch number and composition, purity and concentrations (where appropriate), or other characterizations to appropriately identify each batch of the test substance) and the stability are the responsibility of the Sponsor. Documentation of the characterization is located at the Sponsor. It is unknown whether the analysis of the test substance was performed in a GLP compliant manner.

Retention samples were taken and archived.

Analysis of Mixtures

Samples were removed from each treatment and the control on Day 0 and Day 4 and analyzed for carbon content.

Samples were taken from 0.2mg/L, 1mg/L and 5mg/L treatments on Day 2 when terminated.

The results of these analyses are included in Appendix A on page 17.

Test System

Selenastrum capricornutum - culture date 3-Mar-93

Justification for Selection of Test System

Selenastrum capricornutum is a common test species for freshwater toxicity studies.

Supplier

Cultured in the Environmental Toxicology Laboratory of Exxon Biomedical Sciences, Inc. Initial strain (#1648) provided by the Department of Botany, University of Texas.

Husbandry and Acclimation

Algae are cultured and tested in algal nutrient media prepared with distilled water and reagent grade chemicals. Cultures of *S. capricornutum* are held at 24 $\pm$ 2°C under continuous illumination (provided by cool-white fluorescent bulbs).

Number

Initial concentration of algae was 5.3 E3 - 8.8 E3 cells/mL in each concentration.

Age at Initiation of Exposure

Algae were taken from stock cultures in log phase of growth.

Test System Identification

Test organisms were not individually identified. All test chambers were labeled to show study number, concentration, randomization number and replicate chamber number.

Selection

Chamber positions were randomly assigned using a computer generated randomization schedule.

Contaminants

There are no known contaminants in the medium believed to be at levels high enough to interfere with this study. The quality of the dilution water used in culture and testing is monitored at semi-annual and annual intervals (Appendix A). There are no known contaminants in the water believed to be at levels high enough to interfere with this study.

Range Finding Test

A 48-hour range finding test was performed to determine the concentrations for the definitive test. Nominal concentrations were: 1g/L, 0.1g/L, 0.05g/L, 0.01g/L and 0.005g/L. A nutrient media control was also tested. Three replicates were prepared for each concentration containing ~1.0 E4 cells/mL. A noticeable reduction in growth occurred in all concentrations except controls.

Definitive Test Design

GROUP	NOMINAL CONCENTRATION (MRD-92-444)(CT-519-920) (mg/L)	NUMBER OF TEST ORGANISMS (cells / mL : 3 replicates)
1 (Control)	0	8.9 E3
2	0.008	8.7 E3
3	0.04	8.7 E3
4	0.2	7.9 E3*
5	1	5.6 E3*
6	5	5.3 E3*

(*) Reduction in cell density within 25 minutes of exposure to the test solutions.

Preparation and Administration of Test Material

A 5mg/L stock solution was prepared by adding the appropriate amount of test material to algal nutrient media. The stock was mixed (< 10% vortex) on a magnetic stirplate with a Teflon® coated stirbar for approximately 1 hour. The stock solution appeared clear. The stock solution was mixed with algal nutrient media to prepare the treatments. An aliquot was removed from each treatment for analytical chemistry sampling and the pH of each treatment was measured and adjusted to 7.5 ± 0.1[4], as necessary. A 50mL aliquot of each treatment solution was removed to serve as a media/toxicant blank. 150mL of the treatment solution was inoculated with algae and divided into 3 replicate chambers. Test chambers were closed with cotton-gauze stoppers during the study to minimize evaporation and/or volatilization. Test flasks were placed on a shaker table (100rpm) to keep the algae in suspension and facilitate the transfer of CO_2.

Test Chamber / Volume

125mL autoclaved glass Erlenmeyer flasks/ 50mL

Exposure Duration

96 hours

Exposure Conditions

Mean test temperature: 23.6 ± 0.2°C (s.d.), continuously monitored.

Continuous light: intensity ranged from 4400 to 4500 Lux during the study.

Oscillation Rate: 100 oscillations / minute (verified daily).

Experimental Evaluation

Cell densities were determined for each replicate chamber at 0, 24, 48, 72 and 96 hours (± 1 hour) using a Turner filter fluorometer. The pH was measured on Day 0 and Day 4. Additionally, pH measurements were taken on 0.2mg/L, 1mg/L and 5mg/L concentrations when terminated on Day 2. No evidence of test material insolubility was observed in the test chambers during the study. After the 96-hour period, monitoring of environmental conditions was discontinued.

Disposal

Test solutions are disposed of under the supervision of the Site Hazardous Waste Coordinator of Exxon Biomedical Sciences, Inc.

[4]In accordance with EPA-600/9-78-018

RESULTS

Due to the low percentage of carbon in this material (20.86%) and the variability of the analytical method at the loading levels tested, measured concentrations of the test material could not be determined. As such (and since this material is soluble), nominal concentrations were used for statistical evaluation and reporting.

A noticeable reduction in cell density was observed in the 1mg/L and 5mg/L treatments after 25 minutes of exposure to the test material. After 24 hours, the 0.2mg/L, 1mg/L and 5mg/L cell densities were below detectable limits. A reduction in cell density was observed in the 0.4mg/L treatment after 24 hours of exposure and growth was inhibited throughout the 96 hour study.

All values were calculated based upon nominal treatment levels.

Nominal Conc. (mg/L)	% Inhibition			
	Growth Rate		Growth	
	72 hours	96 hours	72 hours	96 hours
0.008	(2.5)	(1.0)	10.6	13.0
0.04	22.0	13.7	73.2	68.0
0.2	100	100	99.8	99.7
1	100	100	99.7	99.6
5	100	100	99.7	99.6

Note: values in ( ) represent stimulation of growth.

The NOEC values were determined using the ANOVA procedure[5] of SAS[6].

BASED ON NOMINAL LEVELS

Exposure (hrs.)	NOEC (mg/L)	LOEC (mg/L)	Criterion
72 and 96	0.008	0.04	Growth Rate
72 and 96	0.008	0.04	Growth (Biomass)

[5]Duncan, D.B. (1975), *t-Tests and Intervals for Comparisons Suggested by the Data*, Biometrics, 31, 339-359

[6]*SAS User's Guide: Statistics*, Version 5.18 Edition. SAS Institute, Inc., Cary, NC. 1985.

RESULTS (cont'd)

EC50 values were determined on the percent inhibition as relative to the control values. For the E_rC50 calculations, the specific growth rates for each treatment were determined by calculating the slope of the regression line of the ln(cell density) by time using the PROC REGRESSION procedure of SAS. For the E_bC50 values, the area under the growth curves was calculated in accordance with the equations in OECD Method 201.

Calculations using the nominal treatment concentrations were determined as follows. The EC50 values were calculated by using the inverse interpolation method of Snedecor and Cochran[7]. This approach converts the inhibition values into probit values and develops a regression equation with the treatment concentration (E_rC50) or ln(treatment concentration, E_bC50) and then determines the concentration corresponding to a probit value of 0.0. Appropriate 95% confidence intervals are then based on the equations from section 9.12 of Snedecor and Cochran.

	Nominal EC50 (mg/L)	95% Confidence Intervals
E_rC50 (0-72 hour)	0.047	0 - 6.70
E_rC50 (0-96 hour)	0.058	0 - 9.98
E_bC50 (0-72 hour)	0.029	Could Not Calculate
E_bC50 (0-96 hour)	0.031	Could Not Calculate

Tables 1 and 2 present the cell concentrations per flask and mean cell concentrations per treatment during the test. Appendix A presents the analytical chemistry methods and results (including the calculated measured concentrations of test material) and the dilution water analysis. Growth curves are depicted in Figure 1. Figure 2 presents a graphical representation of the concentration effect relationship.

[7]Snedecor, G.W. and W.G. Cochran, *Statistical Methods*, 8th Edition, 1989, Iowa State University Press / Ames.

GUIDELINE / REGULATION DEVIATIONS

Illumination during the test was 4300 Lux (~300μE/m^{2}s) rather than 120μE/m^{2}s as recommended in the guideline. Various sources in the literature recommend 300μE/m^{2}s for *Selenastrum capricornutum* (US EPA[8], FDA[9]). Laboratory stock cultures are maintained at ~4300 Lux and reducing the illumination could adversely affect the viability of the test organisms.

It is unknown if the analysis to support the characterization of the test material was performed in a GLP compliant manner.

The range finding study was terminated after 48 hours since all the treatment cell densities were below the minimal detectable limits after the 48-hour period.

RECORDS

All appropriate materials, methods and experimental measurements required in the protocol were recorded and documented in the raw data. Any changes, additions or revisions to the protocol were approved by the Study Director and the Sponsor Representative. These changes were documented in writing, and include the date, the signatures of the Study Director and the Sponsor Representative and the justification for the change.

A copy of the protocol, final report, raw data, computer generated listings of raw data and supporting documentation were deposited in the Archives of Exxon Biomedical Sciences, Inc.

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[8] *Algal Acute Toxicity Test.* Subpart B, 797.1050. Federal Register / Vol. 50, No. 188, Friday, September 27, 1985. Amendment: Federal Register / Vol. 52, No. 97 / Wednesday, May 20, 1987; Effective Date 19-Jun-87.

[9] Algal Assay, Document 4.01. *Environmental Assessment Technical Assistance Handbook.* Food And Drug Administration. March 1987.

Table 1 - Cell Concentrations per Flask (cells / mL)

Conc. (mg/L)	Replicate	Day 0	Day 1	Day 2	Day 3	Day 4
Control	1	8.7 E3	2.1 E4	1.1 E5	2.6 E5	5.1 E5
	2	8.7 E3	2.1 E4	1.1 E5	2.7 E5	5.3 E5
	3	9.3 E3	2.3 E4	1.4 E5	3.3 E5	6.2 E5
0.008	1	8.4 E3	1.5 E4	1.3 E5	2.9 E5	4.6 E5
	2	8.7 E3	1.7 E4	1.0 E5	2.6 E5	4.8 E5
	3	9.0 E3	8.1 E3	1.0 E5	2.5 E5	4.2 E5
0.04	1	8.4 E3	BMDL	1.4 E4	5.3 E4	9.2 E4
	2	8.7 E3	7.8 E3	4.7 E4	1.6 E5	2.5 E5
	3	9.0 E3	BMDL	2.6 E4	1.4 E5	2.3 E5
0.2	1	7.8 E3	BMDL	BMDL	N/A	N/A
	2	8.1 E3	BMDL	BMDL	N/A	N/A
	3	7.8 E3	BMDL	BMDL	N/A	N/A
1	1	6.0 E3	BMDL	BMDL	N/A	N/A
	2	5.4 E3	BMDL	BMDL	N/A	N/A
	3	5.4 E3	BMDL	BMDL	N/A	N/A
5	1	5.7 E3	BMDL	BMDL	N/A	N/A
	2	5.7 E3	BMDL	BMDL	N/A	N/A
	3	4.4 E3	BMDL	BMDL	N/A	N/A

Table 2 - Mean Cell Concentrations (cells / mL)

Conc. (mg/L)	Day 0	pH	Day 1	Day 2	Day 3	Day 4	pH
Control	8.9 E3	7.6	2.2 E4	1.2 E5	2.9 E5	5.5 E5	6.9
0.008	8.7 E3	7.5	1.3 E4	1.1 E5	2.7 E5	4.5 E5	7.1
0.04	8.7 E3	7.4	2.6 E3	2.9 E4	1.2 E5	1.9 E5	7.1
0.2	7.9 E3	7.4	BMDL	BMDL	N/A	N/A	6.9*
1	5.6 E3	7.4	BMDL	BMDL	N/A	N/A	7.0*
5	5.3 E3	7.5	BMDL	BMDL	N/A	N/A	7.0*

BMDL: Below Minimum Detction Limits

*pH performed on day 2

Table 3 - Composition of Nutrient Medium

COMPOUND	CONCENTRATION (mg/L)	ELEMENT	CONCENTRATION (mg/L)
$NaNO_3$	25.500	N	4.202
$MgCl_2 \cdot 6H_2O$	12.164	Mg	2.904
$CaCl_2 \cdot 2H_2O$	4.410	Ca	1.202
$MgSO_4 \cdot 7H_2O$	14.700	S	1.912
K_2HPO_4	1.044	P	0.186
$NaHCO_3$	15.000	Na	11.002
		K	0.469
		C	2.145

COMPOUND	CONCENTRATION (μg/L)	ELEMENT	CONCENTRATION (μg/L)
H_3BO_3	185.52	B	32.434
$MnCl_2 \cdot 4H_2O$	415.38	Mn	115.308
$ZnCl_2$	3.270	Zn	1.569
$CoCl_2 \cdot 6H_2O$	1.428	Co	0.354
$CuCl_2 \cdot 2H_2O$	0.012	Cu	0.004
$Na_2MoO_4 \cdot 2H_2O$	7.260	Mo	2.879
$FeCl_3 \cdot 6H_2O$	159.76	Fe	33.008

Based on **Miller, W. E., J. C. Greene and Tamotsu Shiroyama**, 1978. The *Selenastrum capricornutum* Printz Algal Assay Bottle Test. EPA-600/9-78-018.

Appendix A Analytical Results

Analytical Chemistry Results

Due to the complex nature of the test material, samples of the test matrix containing MRD-92-444 (CT-519-92O) were analyzed for Dissolved Organic Carbon[10] (DOC) content. DOC results were obtained by filtering the samples through a 0.45μm Teflon® filter and analyzing for Total Carbon (TC) and Inorganic Carbon (IC) with the difference between the two values considered DOC. Samples were analyzed using a Dohrmann DC-190 Total Organic Carbon Analyzer.

This material is known to be completely soluble (as identified on the Material Safety Data Sheet). DOC analysis was performed to confirm the presence of organic material in solution. Due to the small loading rates (<5mg/L) and the low percentage of carbon in this material, quantification by general methodologies (eg. DOC analysis) can be highly variable (demonstrated by the day 4 values which ranged from being non-detectable to >100% of the day 0 measured concentrations).

Nominal Chemical Conc. (mg/L)	DOC (ppm)		Measured★ Chemical Concentration (mg/L)		Percentage of Material at Termination
	Day 0	Day 4	Day 0	Day 4	
Control	1.490 ± 0.081	1.765 ± 0.102	-	-	-
0.008	1.539 ± 0.177	1.408 ± 0.192	0.23	ND	ND
0.04	0.416 ± 0.000	1.352 ± 0.232	ND	ND	ND
0.2	1.000 ± 0.279	*2.421 ± 0.262	ND	3.14	>100
1	0.820 ± 0.104	*2.025 ± 0.138	ND	1.25	>100
5	1.405 ± 0.914	*2.005 ± 0.092	ND	1.15	>100

(*) Samples taken on day 2 (10 Mar 93) at termination

ND - None detected

Note: MRD-92-444 is 20.86% carbon

★ Treatment levels were converted from nominal values to measured values in the following manner

(Treatment DOC value - Control DOC value) / % carbon content of the test material.

[10]American Public Health Association, American Water Works Association and Water Pollution Control Federation. 1989. *Standard Methods for the Examination of Water and Wastewater*, 17th ed. American Public Health Association, Washington, D.C. Method 5310B, Combustion-Infrared.

Dilution Water (Carrier Water) Analysis

The dilution water used by the Environmental Toxicology Laboratory is ground water from a well located at the Environmental Toxicology Laboratory in East Millstone, NJ. The well water is treated by the system depicted in Figure A-1. The water system is composed of glass, 316 stainless steel and Teflon® and contains no materials known to leach into the water. The media used during this study was prepared with glass distilled water. The feed water for the distillation system is reverse osmosis dialyzed well water.

The following water quality data is most representative of the water used in the preparation of algal nutrient media used during the in-life period of the study. Table A-1 presents the analyses of the chemical pollutant parameters of the carbon treated well water ("SV-5"),that supplies the Reverse Osmosis unit. These analyses are performed by a contracted laboratory.

Table A-1 Priority Pollutants

Semi-annual Dilution Water Analysis
Base/Neutral Compounds

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Acenaphthene	µg/L	1.9	ND
Acenaphthylene	µg/L	3.5	ND
Anthracene	µg/L	1.9	ND
Benzidine	µg/L	44.	ND
Benzo(a)anthracene	µg/L	7.9	ND
Benzo(a)pyrene	µg/L	2.5	ND
Benzo(b)fluoranthene	µg/L	4.8	ND
Benzo(ghi)perylene	µg/L	4.1	ND
Benzo(k)fluoranthene	µg/L	2.5	ND
bis(2-Chloroethoxy)methane	µg/L	5.4	ND
bis(2-Chloroethyl)ether	µg/L	5.8	ND
bis(2-Chloroisopropyl)ether	µg/L	5.8	ND
bis(2-Ethylhexyl)phthalate	µg/L	10.	ND
4-Bromophenyl phenyl ether	µg/L	1.9	ND
Butyl benzyl phthalate	µg/L	10.	ND
2-Chloronaphthalene	µg/L	1.9	ND
4-Chlorophenyl phenyl ether	µg/L	4.2	ND
Chrysene	µg/L	2.5	ND
Dibenzo(a,h)anthracene	µg/L	2.5	ND
1,2-Dichlorobenzene	µg/L	1.9	ND
1,3-Dichlorobenzene	µg/L	1.9	ND
1,4-Dichlorobenzene	µg/L	4.4	ND
3,3'-Dichlorobenzidine	µg/L	16.7	ND
Diethyl phthalate	µg/L	10.	ND
Dimethyl phthalate	µg/L	5.1	ND
Di-n-butyl phthalate	µg/L	10.	ND
2,4-Dinitrotoluene	µg/L	5.8	ND
2,6-Dinitrotoluene	µg/L	1.9	ND
Di-n-octyl phthalate	µg/L	10.	ND
1,2-Diphenylhydrazine	µg/L	10.	ND
Fluoranthene	µg/L	2.2	ND
Fluorene	µg/L	1.9	ND
Hexachlorobenzene	µg/L	1.9	ND
Hexachlorobutadiene	µg/L	0.91	ND
Hexachlorocyclopentadiene	µg/L	10.	ND
Hexachloroethane	µg/L	1.6	ND
Indeno(1,2,3-c,d)pyrene	µg/L	3.7	ND
Isophorone	µg/L	2.2	ND
Naphthalene	µg/L	1.6	ND

MDL = Minimum Detection Limits
ND = None Detected

Table A-1 Priority Pollutants (continued)

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Nitrobenzene	µg/L	1.9	ND
N-Nitrosodimethylamine	µg/L	10.	ND
N-Nitrosodi-n-propylamine	µg/L	10.	ND
N-Nitrosodiphenylamine	µg/L	1.9	ND
Phenanthrene	µg/L	5.5	ND
Pyrene	µg/L	1.9	ND
1,2,4-Trichlorobenzene	µg/L	1.9	ND

Pesticides/PCB Compounds

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Aldrin	µg/L	0.051	ND
Alpha-BHC	µg/L	0.051	ND
Beta-BHC	µg/L	0.051	ND
Gamma-BHC	µg/L	0.051	ND
Delta-BHC	µg/L	0.051	ND
Chlordane	µg/L	1.0	ND
4,4'-DDT	µg/L	0.10	ND
4,4'-DDE	µg/L	0.10	ND
4,4'-DDD	µg/L	0.10	ND
Dieldrin	µg/L	0.10	ND
Endosulfan I	µg/L	0.051	ND
Endosulfan II	µg/L	0.10	ND
Endosulfan sulfate	µg/L	0.10	ND
Endrin	µg/L	0.10	ND
Endrin aldehyde	µg/L	0.10	ND
Heptachlor	µg/L	0.051	ND
Heptachlor epoxide	µg/L	0.051	ND
Aroclor-1242	µg/L	0.51	ND
Aroclor-1254	µg/L	1.0	ND
Aroclor-1221	µg/L	0.51	ND
Aroclor-1232	µg/L	0.51	ND
Aroclor-1248	µg/L	0.51	ND
Aroclor-1260	µg/L	1.0	ND
Aroclor-1016	µg/L	0.51	ND
Toxaphene	µg/L	2.0	ND
Endrin ketone	µg/L	0.10	ND
Methoxychlor	µg/L	0.51	ND

MDL = Minimum Detection Limits
ND = None Detected

Table A-1 Priority Pollutants (continued)

Acid Compounds

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
2-Chlorophenol	µg/L	3.3	ND
2,4-Dichlorophenol	µg/L	2.7	ND
2,4-Dimethylphenol	µg/L	2.7	ND
4,6-Dinitro-o-cresol	µg/L	24.	ND
2,4-Dinitrophenol	µg/L	42.	ND
2-Nitrophenol	µg/L	3.6	ND
4-Nitrophenol	µg/L	2.4	ND
p-Chloro-m-cresol	µg/L	3.0	ND
Pentachlorophenol	µg/L	3.6	ND
Phenol	µg/L	1.5	ND
2,4,6-Trichlorophenol	µg/L	2.7	ND

Volatile Compounds

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Acrolein	µg/L	100.	ND
Acrylonitrile	µg/L	100.	ND
Benzene	µg/L	4.4	ND
bis(Chloromethyl)ether	µg/L	10.	ND
Bromoform	µg/L	4.7	ND
Carbon tetrachloride	µg/L	2.8	ND
Chlorobenzene	µg/L	6.0	ND
Chlorodibromomethane	µg/L	3.1	ND
Chloroethane	µg/L	10.	ND
2-Chloroethylvinyl ether	µg/L	10.	ND
Chloroform	µg/L	1.6	ND
Dichlorobromomethane	µg/L	2.2	ND
Dichlorodifluoromethane	µg/L	10.	ND
1,1-Dichloroethane	µg/L	4.7	ND
1,2-Dichloroethane	µg/L	2.8	ND
1,1-Dichloroethylene	µg/L	2.8	ND
1,2-Dichloropropane	µg/L	6.0	ND
cis-1,3-Dichloropropylene	µg/L	5.0	ND
Ethylbenzene	µg/L	7.2	ND
Methyl bromide	µg/L	10.	ND
Methyl chloride	µg/L	10.	ND
Methylene chloride	µg/L	2.8	7.99

MDL = Minimum Detection Limits
ND = None Detected

Table A-1 Priority Pollutants (continued)

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
1,1,2,2-Tetrachloroethane	µg/L	6.9	ND
Tetrachloroethylene	µg/L	4.1	ND
Toluene	µg/L	6.0	ND
1,2-Trans-dichloroethylene	µg/L	1.6	ND
1,1,1-Trichloroethane	µg/L	3.8	ND
1,1,2-Trichloroethane	µg/L	5.0	ND
Trichloroethylene	µg/L	1.9	ND
Trichlorofluoromethane	µg/L	10.	ND
Vinyl chloride	µg/L	10.	ND
trans-1,3-Dichloropropylene	µg/L	10.	ND

Metals, Cyanides, Phenols

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Antimony	µg/L	60.	ND
Arsenic	µg/L	10.	BMDL
Beryllium	µg/L	1.0	ND
Cadmium	µg/L	2.0	ND
Chromium	µg/L	10.	ND
Copper	µg/L	10.	ND
Lead	µg/L	5.0	ND
Mercury	µg/L	0.20	BMDL
Nickel	µg/L	20.	ND
Selenium	µg/L	10.0	ND
Silver	µg/L	10.	ND
Thallium	µg/L	10.	ND
Zinc	µg/L	20.	ND
Cyanide, Total	mg/L	0.025	<.025
Phenolics, Total	mg/L	0.050	<.050

Pesticides

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Carbophenothion	µg/L	10.	ND
Thionazin	µg/L	1.0	ND
Dimethoate	µg/L	2.5	ND
Disulfoton	µg/L	0.51	ND
Methyl parathion	µg/L	1.0	ND
Parathion	µg/L	1.0	ND
Phorate	µg/L	2.5	ND
Famphur	µg/L	10.	ND
Tetraethylpyrophosphate	µg/L	2.5	ND

BMDL = Below Minimum Detection Limits MDL = Minimum Detection Limits
ND = None Detected

Table A-1 Priority Pollutants (continued)

Herbicides

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
2,4-D	µg/L	3.6	ND
2,4,5-TP (Silvex)	µg/L	0.71	ND

Miscellaneous Analyses

Description	Unit	MDL	Sampled 27-JAN-93 Well Water
Ammonia as N	mg/L	.05	.07
Ammonia Unionized	% of total		0.914
Total Suspended Solids	mg/L	4.	<4
Residual Chlorine	mg/L	0.1	< .1

Annual Analyses

Description	Unit	MDL	Reverse Osmosis Water
Standard Plate Count[A1]	col/mL	1.	<1.0
Water Suitability Test[A1]		(Standard)	(Ratio "A")
(Microbacterial Properties)		0.8-3.0	1.19

MDL = Minimum Detection Limits
ND = None Detected

A1. performed on SV13 (Reverse Osmosis water); sampled 27-Jan-93

Figure A-1 Environmental Toxicology Laboratory Water System

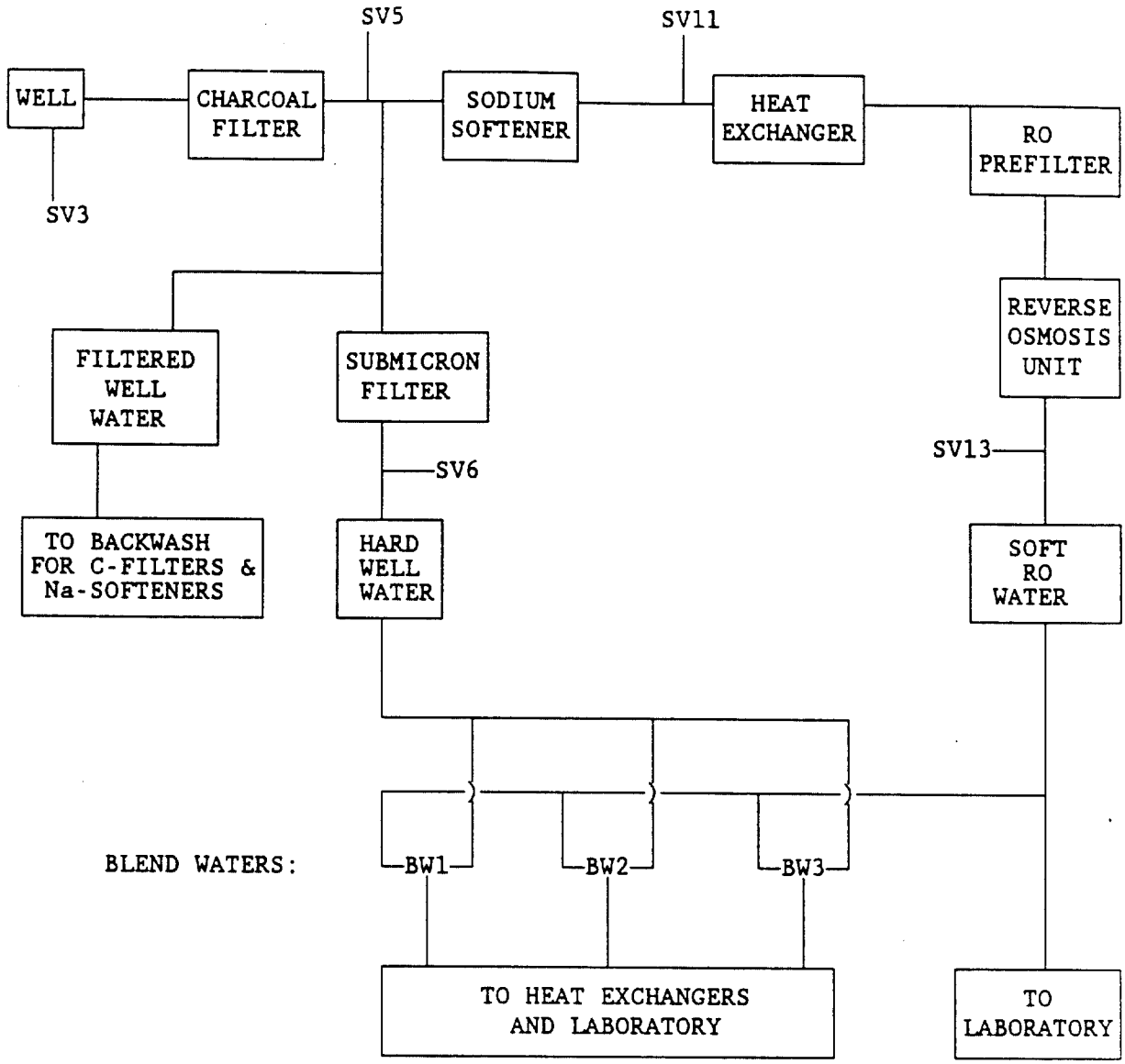


Figure 1 - Growth Curves

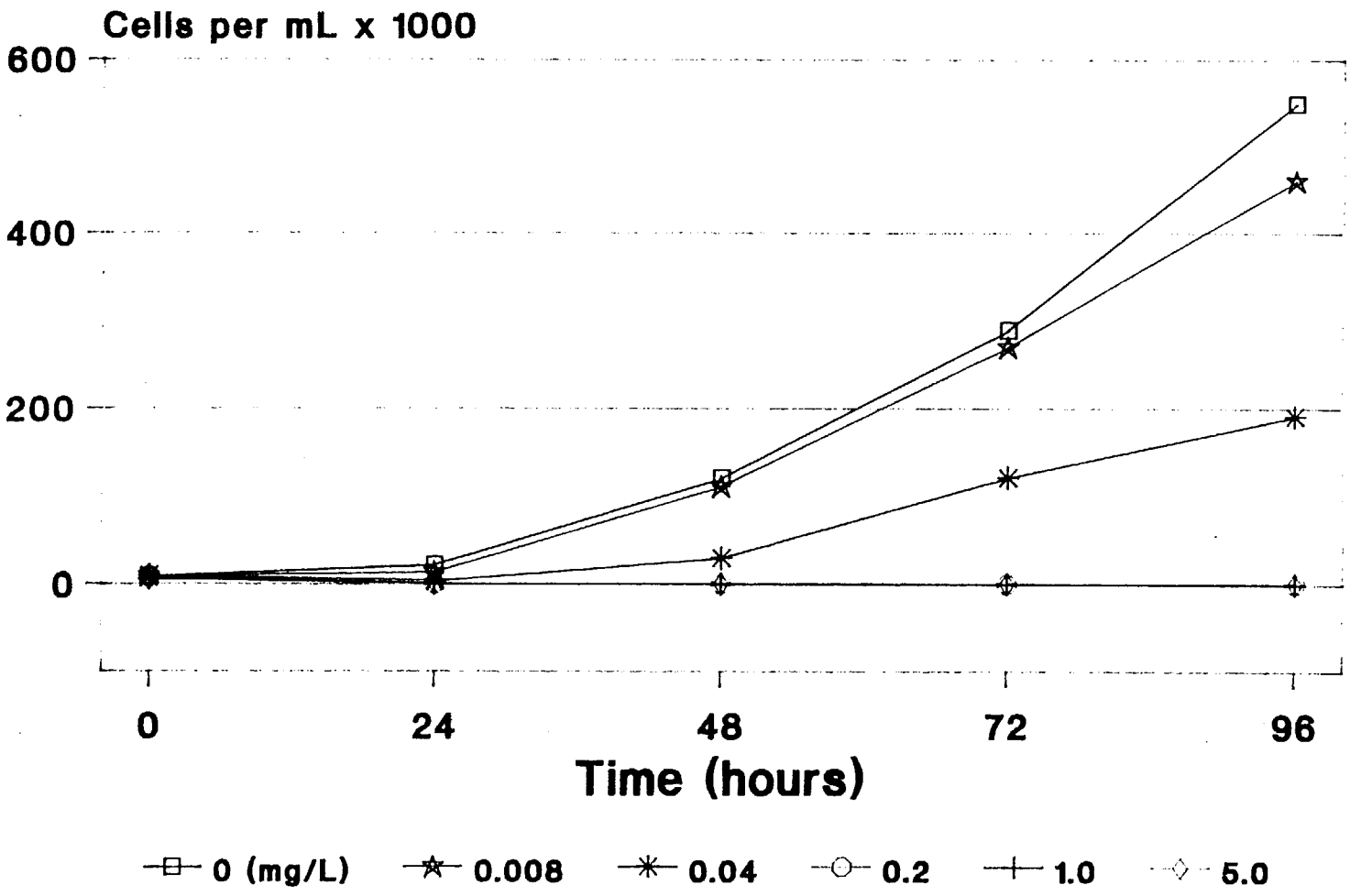
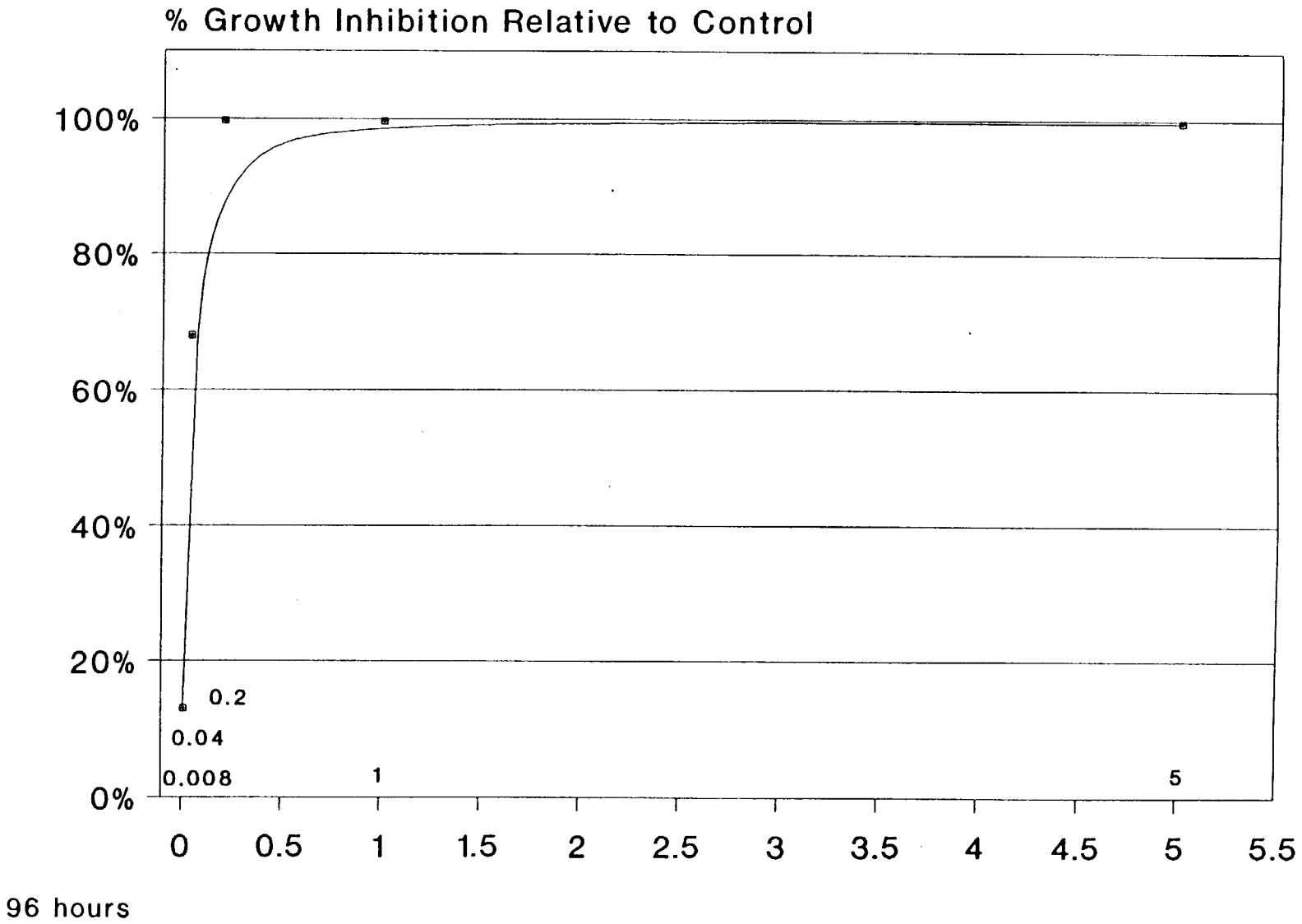


Figure 2 - Concentration - Effect Relationship



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

APR 19 1994

EPA acknowledges the receipt of information submitted by your organization under Section 8(e) of the Toxic Substances Control Act (TSCA). For your reference, copies of the first page(s) of your submission(s) are enclosed and display the TSCA §8(e) Document Control Number (e.g., 8EHQ-00-0000) assigned by EPA to your submission(s). Please cite this number when submitting follow-up or supplemental information and refer to the reverse side of this page for "EPA Information Requests".

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Please address any further correspondence with the Agency related to this TSCA 8(e) submission to:

Document Processing Center (7407)
Attn: TSCA Section 8(e) Coordinator
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
Washington, D.C. 20460-0001

EPA looks forward to continued cooperation with your organization in its ongoing efforts to evaluate and manage potential risks posed by chemicals to health and the environment.

Sincerely,

Terry R. O'Bryan

Terry R. O'Bryan
Risk Analysis Branch

Enclosure

12748 A

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CECATS/TRIAGE TRACKING DBASE ENTRY FORM

CECATS DATA:
Submission # 8EHQ- 1193-12748 SEQ. A

TYPE: (INT.) SUPP FLWP

SUBMITTER NAME: American Cyanamid Company

SUB. DATE: 11/03/93 OTS DATE: 11/04/93 CSRAD DATE: 11/24/93

CHEMICAL NAME: MRD-92-444 → None

[redacted] Chemicals → None

[redacted] (PCA)

[redacted]

CAS#

7732-18-5

42751-79-1

[redacted]

INFORMATION REQUESTED: FLWP DATE:
0501 NO INFO REQUESTED
0502 INFO REQUESTED (TECH)
0503 INFO REQUESTED (VOL ACTIONS)
0504 INFO REQUESTED (REPORTING RATIONALE)

DISPOSITION:
(0639) REFER TO CHEMICAL SCREENING
0678 CAP NOTICE

VOLUNTARY ACTIONS:
(0401) NO ACTION REPORTED
0402 STUDIES PLANNED/UNDERWAY
0403 NOTIFICATION OF WORKER/OTHERS
0404 LABEL/MSDS CHANGES
0405 PROCESS/HANDLING CHANGES
0406 APP./USE DISCONTINUED
0407 PRODUCTION DISCONTINUED
0408 CONFIDENTIAL

INFORMATION TYPE:		P F C
0201	ONC O (HUMAN)	01 02 04
0202	ONC O (ANIMAL)	01 02 04
0203	CELL TRANS (IN VITRO)	01 02 04
0204	MUTA (IN VITRO)	01 02 04
0205	MUTA (IN VIVO)	01 02 04
0206	REPRO/TERATO (HUMAN)	01 02 04
0207	REPRO/TERATO (ANIMAL)	01 02 04
0208	NEURO (HUMAN)	01 02 04
0209	NEURO (ANIMAL)	01 02 04
0210	ACUTE TOX. (HUMAN)	01 02 04
0211	CHR. TOX. (HUMAN)	01 02 04
0212	ACUTE TOX. (ANIMAL)	01 02 04
0213	SUB ACUTE TOX (ANIMAL)	01 02 04
0214	SUB CHRONIC TOX (ANIMAL)	01 02 04
0215	CHRONIC TOX (ANIMAL)	01 02 04

INFORMATION TYPE:		P F C
0216	EPI/CLIN	01 02 04
0217	HUMAN EXPOS (PROD CONTAM)	01 02 04
0218	HUMAN EXPOS (ACCIDENTAL)	01 02 04
0219	HUMAN EXPOS (MONITORING)	01 02 04
(0220)	ECO/AQUA TOX	01 02 04
0221	ENV. OCCC/REL/FATE	01 02 04
0222	EMER INCI OF ENV CONTAM	01 02 04
0223	RESPONSE REQEST DELAY	01 02 04
0224	PROD/COMP/CHEM ID	01 02 04
0225	REPORTING RATIONALE	01 02 04
0226	CONFIDENTIAL	01 02 04
0227	ALLERG (HUMAN)	01 02 04
0228	ALLERG (ANIMAL)	01 02 04
0239	METAB/PHARMACO (ANIMAL)	01 02 04
0240	METAB/PHARMACO (HUMAN)	01 02 04

INFORMATION TYPE:		P F C
0241	IMMUNO (ANIMAL)	01 02 04
0242	IMMUNO (HUMAN)	01 02 04
(0243)	CHEM/PHYS PROP	01 02 04
0244	CLASTO (IN VITRO)	01 02 04
0245	CLASTO (ANIMAL)	01 02 04
0246	CLASTO (HUMAN)	01 02 04
0247	DNA DAM/REPAIR	01 02 04
(0248)	PROD/USE/PROC	01 02 04
0251	MSDS	01 02 04
0299	OTHER	01 02 04

TRIAGE DATA:

NON-CBI INVENTORY
(YES (CONTINUE))
NO (DROP)
DETERMINE

ONGOING REVIEW
YES (DROP/REFER)
NO (CONTINUE)
REFER

SPECIES
freshwater species Alga

TOXICOLOGICAL CONCERN:
LOW
MED
HIGH

USE: commercial cationic polymer mixture

PRODUCTION:

COMMENTS: [illegible], 8ehq-1193-12747